Market power and voluntary land redistribution

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Abstract

Inequality in land ownership remains a major issue in many developing countries, such as Brazil, Colombia, and South Africa. Donors advocate a new model of "willing-buyer willing-seller", market-led land redistribution, but actual redistribution has fallen short of expectations. Little effort has been made so far to formalize the obstacles to market-led land redistribution. In this paper, we show that oligopolistic owner-producers may resist land sales to poorer candidate-buyers not only because they have a lower willingness to pay for land but also because the entry of poorer entrants threatens tacit collusion.

Keywords: Land reform, Oligopoly.

JEL Classification: Q15, L13.

1 Introduction

Land Gini ratios are still above 0.7 in South Africa, Kenya, Colombia, Brazil, Argentina, and many more African and Latin American countries. Land reform is therefore as much as ever on the agenda,[1] but the traditional state-led, authoritative model has given way to decentralised, market-led land reforms (e.g., in Brazil, Colombia, and South Africa), through which "beneficiaries receive a combination of grants and loans from the public and private

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[1] As illustrated by the publication in 2003 of a "Land Policies for Growth and Poverty Reduction" report by the World Bank (Deininger, 2003).

sectors which they use to negotiate the purchase of land from willing sellers" (World Bank 2006) . The market-led land reform (MLLR) model is however highly controversial among scholars and policy actors, and the amount of land transferred through these schemes is below target.

In addition, these programmes have been criticised for not benefiting the poorest (Borras, 2003; Hall *et al.*, 2003). Several authors and actors in the program have identified a resistance from the behalf of the current landowners related to power relations in the agrarian economy (Borras 2003; van den Brink et al. 2006, p.41), thus preventing MLLR to achieve actual land redistribution from the land rich to the land poor. The existing theoretical frameworks concerned with land redistribution do not deal with *market*-led land redistribution, but focus on *state*-led land redistribution policies.

In the present paper, we seek an explanation of why landowners could refuse *land payment offers* emanating from poorer candidate buyers because the entry of the latter would threaten the current system of joint rent extraction by the owner-producers. More specifically, we show that, though assuming the two conditions identified by the World Bank (World Bank, 2006) as the conditions justifying land reform, *i.e.*, (i) credit and insurance constraints weighting on the poor, and (ii) the existence of unused land and would-be farmers, in sectors where agricultural producers enjoy a degree of market power, they will discriminate against poorer candidate land buyers. This is the case because poorer individuals discount the future more and therefore not only have a lower present value of farm profits (and thus a lower willingness to pay for the land), but also threaten tacit collusion. The justification for considering the case of oligopolistic markets is threefold: (1) the highly concentrated pattern of land ownership and use in many countries concerned with MLLR, (2) the existence of strong farmer organizations for several sectors in these countries, and (3) the often imperfect transmission of world prices to local prices, despite the trade liberalization that occurred in most countries in the 1990s (see Krivonos and Olarreaga, 2006 for sugar cane in Brazil; and Watkinson and Makgetla, 2002, who express concerns that the level of concentration of South African maize producers "gives rise to concern about price collusion and profiteering", p.12).

2 Occurrence of land sales in an oligopolistic agricultural market

The agricultural sector is modelled as an oligopolistic market, where n producers compete in quantity at each period on the output y, in an infinitely repeated game. Producers are all endowed with the same technology $C(y) = cy$.[2] The inverse demand function is $P(y) = \alpha - y$, which we assume to be constant over time. Finally, we denote $\mathcal{O}$ the set of oligopolists. We assume that farmers have the institutional opportunities to form a coalition, *e.g. via* the relations developed in sectorial producer organizations. At the collusive equilibrium, each farmer produces an equal share of the collusive output that maximises their joint profits. Denoting y_n^C the quantity of output produced by each farmer and π_n^C the individual instantaneous profit at the collusion equilibrium, we have:

$$y_n^C = \frac{\alpha - c}{2n},\ \pi_n^C = \left(\frac{\alpha - c}{2}\right)^2 \frac{1}{n}$$

If some producer unilaterally deviates from the collusive equilibrium, then he produces the quantity y_n^D that maximizes his instantaneous profit, and receives the profit π_n^D the time he deviates, with:

$$y_n^D = \frac{(\alpha - c)(n+1)}{4n},\ \pi_n^D = \frac{(n+1)^2(\alpha - c)^2}{(4n)^2}$$

Finally, the quantity produced by each farmer at the Cournot equilibrium and the corresponding individual profit are denoted y_n^{NC} and π_n^{NC}, and are given by

$$y_n^{NC} = \frac{\alpha - c}{n+1},\ \pi_n^{NC} = \left(\frac{\alpha - c}{n+1}\right)^2$$

Because of its prisoner dilemma structure, the collusive outcome is not a Nash equilibrium of the one-shot game. However, if oligopolists agree on the fact that any deviation from the cooperative strategy triggers a switch to the Cournot equilibrium forever after, then the collusive outcome at each date is a Nash equilibrium of the repeated game, if producers are sufficiently patient. [3]

Proposition 1 *Let δ_i denote i's discount rate, and $\rho_i := \dfrac{1}{1-\delta_i}$.*

[2] Assuming constant marginal cost is consistent with most existing empirical studies of returns to scale in agriculture, see for instance Berry and Cline (1979), Sen (1981), Carter (1984), Townsend *et al.* (1998).

[3] See Friedman (1971) for the proof.

If $\rho_i \geq \overline{\rho}(n) := \dfrac{\pi_n^D - \pi_n^{NC}}{\pi_n^C - \pi_n^{NC}}$ $\forall$ $i \in \mathcal{O}$, *then the collusive outcome at each date is a Nash equilibrium of the repeated game.*

We now look at what happens when a candidate buyer offers to buy an unused land plot from a producer in different configurations, with respect to the output market outcome, and according to the buyer's discount rate. We make the following assumptions: 1) the sale opportunity is unique, 2) a land plot is enough to produce the Cournot quantity π_{n+1}^{NC}, 3) the price offered by the seller equals the potential buyer's willingness to pay, *i.e.* the seller acts as a local monopolist on land sales, 4) the potential seller would agree to the sale if and only if his intertemporal flow of profits in the event of a sale is greater than his intertemporal flow of profits under the *status quo*. We make these assumptions to show that, even in the most favourable case for the seller, land sellers may refuse to sell to would-be buyers if the latter are too poor.

Let us denote s the potential seller and b the potential buyer of the land plot. There are three cases according to the initial nature of the competition in the agricultural sector (*i.e.* whether $\rho_i \geq \overline{\rho}(n)$ for all $i \in \mathcal{O}$ or not) and the nature of competition in this market after the land sale (*i.e.* whether $\rho_i \geq \overline{\rho}(n+1)$ for all $i \in \mathcal{O} \cup \{b\}$ or not).

The different cases are summarized in the proposition below.

Proposition 2

Case 1 *If* $\rho_i < \overline{\rho}(n)$ *for some* $i \in \mathcal{O}$, *then the sale occurs iff* $\rho_b > \dfrac{2}{n+1}\rho_s$.

Case 2 *If* $\rho_i \geq \overline{\rho}(n)$ *for all* $i \in \mathcal{O}$, *and if* $\rho_i < \overline{\rho}(n+1)$ *for some* $i \in \mathcal{O} \cup \{b\}$, *then the sale occurs iff* $\rho_b > \dfrac{n^2+4}{4n}\rho_s$.

Case 3 *If* $\rho_i \geq \overline{\rho}(n)$ *for all* $i \in \mathcal{O}$, *and if* $\rho_i \geq \overline{\rho}(n+1)$ *for all* $i \in \mathcal{O} \cup \{b\}$, *then the sale occurs iff* $\rho_b > \dfrac{1}{n}\rho_s$.

3 Interpreting the model: conclusions for market-led land reform

The discount rate of producer i is assumed to depend positively on i's perceived probability that the game will carry on at the next period, and negatively on the interest rate i faces on the credit market. Due to credit constraints in the credit market, poorer candidate farmers face a higher interest rate. Due to poorer health or to rationing on insurance markets, they should also be expected to have a lower perceived probability that the game will continue. Therefore, poorer farmers should have a lower discount rate, and therefore, a lower ρ_i. If tacit collusion is not sustainable before the sale, *i.e.*, if there is some producer $i \in \mathcal{O}$ such that $\rho_i < \overline{\rho}(n)$, then collusion will not be sustainable either after a land sale to any buyer. The would-be buyer b's willingness to pay for the plot is his or her present value of land, namely $\rho_b \pi_{n+1}^{NC}$. A seller s would agree to the sale to buyer b if $\pi_{n+1}^{NC}(\rho_s + \rho_b) > \pi_n^{NC}\rho_s$, *i.e.*, if ρ_b is large enough compared to the decrease in future profits due to there having one more player in the oligopoly game. This is Case 1 of Proposition 2. In this case, the source of preference for a richer buyer arises simply from the fact that richer individuals have a lower discount rate and thus a higher willingness to pay. The source of preference is the same in Case 3 of Proposition 2 where collusion is sustainable both before and after the sale.

In Case 2, there is cooperation in the output market before land transactions, ($\rho_i \geq \overline{\rho}(n)$ for all $i \in \mathcal{O}$) but collusion is not sustainable anymore after the sale, either because some existing producer i is not patient enough ($\rho_i < \overline{\rho}(n+1)$ for some $i \in \mathcal{O}$), or because the potential buyer b would not sustain the collusion ($\rho_b < \overline{\rho}(n+1)$). In this case, a seller s would agree to a sale to buyer b if $\pi_{n+1}^{NC}(\rho_s + \rho_b) > \pi_n^{C}\rho_s$. The price must compensate both the loss of surplus due to the increase in the number of participants, *and* the loss of profit due to the breaking of the cartel. Therefore, the threshold for ρ_b is greater in Case 2 than in Cases 1 and 3. In particular, a sale will not occur for a candidate buyer who is poorer than the seller producer. In this case, a stronger form of anti-poor discrimination appears, insofar as a seller would prefer a richer candidate buyer b_r even if a poorer would-be buyer b_p offered the equivalent of b_r's willingness to pay.

4 Conclusion

This simple model sheds some light on the redistributive limits of MLLR, based on the fact that land transfers involve a transfer of much more than the mere land "good". Assets, and land in particular, are multifaceted sources of value, leading some authors to even argue that "land redistribution is essentially power redistribution" Borras (2005, p.93). Though assuming the two conditions identified by the World Bank as the conditions justifying land reform, namely: credit and insurance constraints weighting on the poor, and the existence of unused land and candidate farmers, we show that MLLR is unlikely to create access to profitable, concentrated commercial agriculture to individuals who are not already well-off, unless the grants/loans are large enough to drastically reduce the interest rate faced by poorer farmers, and/or improve their access to insurance, which may prove very costly.

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